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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648- XC647

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to a Barge Mooring Project

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an incidental harassment authorization.

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that we have issued an incidental harassment authorization (IHA) to the U.S. Navy (Navy) to incidentally harass, by Level B harassment only, four species of marine mammals during construction activities associated with a barge mooring project in Hood Canal, Washington.

DATES: This authorization is effective from July 16, 2013, through September 30, 2013.

ADDRESSES: A copy of the IHA and related documents may be obtained by visiting the internet at: http://www.nmfs.noaa.gov/pr/permits/incidental.htm or by writing to Michael Payne, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East West Highway, Silver Spring, MD 20910. A memorandum describing our adoption of the Navy's Environmental Assessment (2013) and our associated Finding of No Significant Impact, prepared pursuant to the National Environmental Policy Act, are also available at the same site. Documents cited in this notice may also be viewed, by appointment, during regular business hours, at the aforementioned address.

FOR FURTHER INFORMATION CONTACT: Ben Laws, Office of Protected Resources, NMFS, (301) 427-8401.

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 et seq.) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth. NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

Section 101(a)(5)(D) of the MMPA established an expedited process by which citizens of the U.S. can apply for an authorization to incidentally take small numbers of marine mammals by harassment. Section 101(a)(5)(D) establishes a 45-day time limit for NMFS review of an application followed by a 30-day public notice and comment period on any proposed authorizations for the incidental harassment of marine mammals. Within 45 days of the close of

the comment period, NMFS must either issue or deny the authorization. Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: “any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].”

Summary of Request

We received an application on February 6, 2013, from the Navy for the taking of marine mammals incidental to pile driving and removal in association with a barge mooring project in the Hood Canal at Naval Base Kitsap in Bangor, WA (NBKB). The Navy submitted a revised version of the application on April 8, 2013, which we deemed adequate and complete. The barge mooring project is expected to require approximately eight weeks and will occur between July 16 and September 30, 2013. Four species of marine mammals are expected to be affected by the specified activities: California sea lion (Zalophus californianus californianus), harbor seal (Phoca vitulina richardii), harbor porpoise (Phocoena phocoena vomerina), and killer whale (transient only; Orcinus orca). These species may occur year-round in the Hood Canal, with the exception of the California sea lion, which is only present from late summer to late spring (August to early June).

NBKB provides berthing and support services to Navy submarines and other fleet assets. Commander Submarine Development Squadron Five (CSDS-5) is a tenant command on NBKB and is the working repository for deep ocean technology and operational, at-sea application of that technology. CSDS-5 currently moors and operates a research barge at the Service Pier on NBKB and plans to install mooring for a new larger research barge equipped with upgraded

technology necessary for continuing the Navy mission. CSDS-5 currently conducts research equipment operations from an existing 115-ft by 35-ft barge with a 4-ft draft that was constructed in 1940 and cannot accommodate the new research equipment. A new larger barge measuring 260 ft by 85 ft with a 10-ft draft will replace the existing barge. Activities associated with the project include the removal of an existing mooring dolphin, the relocation and addition of floating pier sections, and the installation of up to twenty steel piles to support the barge, electrical transformer platform, and relocated pier sections (see Figures 1-2 and 1-3 in the Navy's application). All steel piles will be driven with a vibratory hammer for their initial embedment depths and may be finished with an impact hammer for proofing, as necessary. Proofing involves striking a driven pile with an impact hammer to verify that it provides the required load-bearing capacity, as indicated by the number of hammer blows per foot of pile advancement. Sound attenuation measures (i.e., bubble curtain) will be used during all impact hammer operations.

For pile driving activities, the Navy used thresholds recommended by NMFS for assessing project impacts, outlined later in this document. The Navy assumed practical spreading loss and used empirically-measured source levels from a similar project conducted at NBKB to estimate potential marine mammal exposures. Predicted exposures are outlined later in this document. The calculations predict that only Level B harassments will occur associated with pile driving or construction activities.

Description of the Specified Activity

NBKB is located on the Hood Canal approximately twenty miles (32 km) west of Seattle, Washington (see Figures 1-1 and 2-1 in the Navy's application). The specified actions with the potential to cause harassment of marine mammals within the waterways adjacent to NBKB,

under the MMPA, are vibratory and impact pile driving and removal of piles via vibratory driver associated with the barge mooring project. All in-water construction activities within the Hood Canal are only permitted during July 16-February 15 in order to protect spawning fish populations; however, the entire barge mooring project is scheduled to be completed by September 30, 2013. Additional details regarding the specified geographic area and construction plans for the project were described in our Federal Register notice of proposed authorization (78 FR 30273; May 22, 2013; hereafter, the FR notice); please see that document or the Navy's application for more information.

The project consists of three components: the relocation and addition to the Port Operations pier, the removal of existing infrastructure, and the installation of the CSDS-5 research barge mooring piles. The barge mooring project is expected to require approximately forty work days and will occur only between July 16 and September 30, 2013. Figures 2-2 and 2-3 of the Navy's application contain details of the project area and site plan. The project is expected to require the installation of sixteen hollow steel pipe piles, including four 20-in diameter piles, three 24-in diameter piles, five 36-in diameter piles, and four 48-in diameter piles. Although only four 48-in piles are expected to be necessary, we include an additional four 48-in piles (for a total of eight 48-in piles and twenty total piles) in the effects analysis in the event that contingency piles are required. The 48-in piles will be the primary mooring supports for the new barge. In addition, one 24-in diameter pile will be removed using vibratory pile driving equipment.

The Navy expects that a maximum of four piles can be driven per day, although this total is unlikely to be reached due to various delays that may be expected during construction work. The total number of days for both extraction and installation are not likely to exceed twenty

workdays. Piles will be installed using mainly vibratory pile driving, although some piles may require impact driving to ensure load bearing capacity (proofing) or if substrate conditions do not allow the pile to reach the specified tip elevation with a vibratory driver. When the impact driver is required, the Navy expects that 500 strikes will be necessary per pile, resulting in approximately 2,000 strikes per day under the maximum scenario. All piles driven with an impact hammer will be surrounded by a bubble curtain over the full water column to minimize in-water noise.

Description of Sound Sources and Distances to Thresholds

An in-depth description of sound sources in general was provided in the FR notice (78 FR 30273; May 22, 2013). Significant sound-producing in-water construction activities associated with the project include impact and vibratory pile driving.

NMFS uses generic sound exposure thresholds to determine when an activity that produces sound might result in impacts to a marine mammal such that a take by harassment might occur. To date, no studies have been conducted that examine impacts to marine mammals from pile driving sounds from which empirical sound thresholds have been established. Current NMFS practice (in relation to the MMPA) regarding exposure of marine mammals to sound is that cetaceans and pinnipeds exposed to sound levels of 180 and 190 dB root mean square (rms; note that all underwater sound levels in this document are referenced to a pressure of 1 μPa) or above, respectively, are considered to have been taken by Level A (i.e., injurious) harassment, while behavioral harassment (Level B) is considered to have occurred when marine mammals are exposed to sounds at or above 120 dB rms for continuous sound (such as will be produced by vibratory pile driving) and 160 dB rms for pulsed sound (produced by impact pile driving), but below injurious thresholds. For airborne sound, pinniped disturbance from haul-outs has been

documented at 100 dB (unweighted) for pinnipeds in general, and at 90 dB (unweighted) for harbor seals (note that all airborne sound levels in this document are referenced to a pressure of 20 μPa). NMFS uses these levels as guidelines to estimate when harassment may occur. NMFS is currently revising these acoustic guidelines. For more information on that process, please visit http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm.

Sound levels can be greatly reduced during impact pile driving using sound attenuation devices. The Navy is required to use sound attenuation devices for all impact pile driving, and has elected to use bubble curtains. Bubble curtains work by creating a column of air bubbles rising around a pile from the substrate to the water surface. The air bubbles absorb and scatter sound waves emanating from the pile, thereby reducing the sound energy. A confined bubble curtain contains the air bubbles within a flexible or rigid sleeve made from plastic, cloth, or pipe. Confined bubble curtains generally offer higher attenuation levels than unconfined curtains because they may physically block sound waves and they prevent air bubbles from migrating away from the pile.

The literature presents a wide array of observed attenuation results for bubble curtains (e.g., Oestman et al., 2009, Coleman, 2011, Caltrans, 2012). The variability in attenuation levels is due to variation in design, as well as differences in site conditions and difficulty in properly installing and operating in-water attenuation devices. As a general rule, reductions of greater than 10 dB cannot be reliably predicted. On the basis of existing data regarding bubble curtain efficacy, as well as site-specific measurements from the Navy's 2011 Test Pile Project (TPP; Illingworth & Rodkin, Inc., 2012), we have determined that 8 dB is a reasonable assumption regarding average SPL (rms) reduction. To avoid loss of attenuation from design and implementation errors, the Navy has required specific bubble curtain design specifications,

including testing requirements for air pressure and flow prior to initial impact hammer use, and a requirement for placement on the substrate.

Distance to Sound Thresholds

Pile driving generates underwater noise that can potentially result in disturbance to marine mammals in the project area. Please see the FR notice (78 FR 30273; May 22, 2013) for a detailed description of the calculations and information used to estimate distances to relevant threshold levels. Transmission loss, or the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source, was estimated as so-called "practical spreading loss". This model follows a geometric propagation loss based on the distance from the pile, resulting in a 4.5 dB reduction in level for each doubling of distance from the source. In the model used here, the sound pressure level (SPL) at some distance away from the source (e.g., driven pile) is governed by a measured source level, minus the transmission loss of the energy as it dissipates with distance.

The intensity of pile driving sounds is greatly influenced by factors such as the type of piles, hammers, and the physical environment in which the activity takes place. The Navy previously conducted measurements for driving of steel piles at NBKB as part of the TPP (Illingworth & Rodkin, Inc., 2012), and we have determined that use of those values is appropriate to determine reasonable SPLs and their associated effects on marine mammals that are likely to result from pile driving at NBKB. During the TPP, SPLs from driving of 24-, 36-, and 48-in piles by impact and vibratory hammers were measured. Because 20-in piles were not measured during the TPP, we use sound pressure levels from the 24-in piles as a conservative estimate. Sound levels associated with vibratory pile removal are assumed to be the same as

those during vibratory installation (Reyff, 2007) – which is likely a conservative assumption – and have been taken into consideration in the modeling analysis.

Representative data for pile driving SPLs recorded from the TPP were presented in the FR notice (78 FR 30273; May 22, 2013). Because it is unknown what size pile may be driven on any given day, the most conservative values (i.e., highest) were used, with practical spreading loss, to estimate distances to relevant thresholds. For impact pile driving, distances to the marine mammal sound thresholds were calculated with the assumption of an 8 dB reduction in source levels from the use of a bubble curtain. Source values (at 10 m) used for calculations were 188 dB for impact driving (196 dB as a representative value, less 8 dB of sound attenuation from use of a bubble curtain) and 172 dB for vibratory driving. For airborne sound during the TPP, vibratory driving was measured at 102 dB and impact driving at 109 dB (both at 15 m). These values were used, with spherical spreading loss, to estimate distances to relevant thresholds. All calculated distances to and the total area encompassed by the marine mammal sound thresholds are provided in Tables 1 and 2. Predicted distances to thresholds for different sources are shown in Figures 6-1 through 6-4 of the Navy's application.

Table 1. Distances to relevant sound thresholds and areas of ensonification

Description	Effective source level (dB at 10 m)	Distance to threshold (m) and associated area of ensonification (km^2)			
		190 dB	180 dB	160 dB	120 dB
Steel piles, impact	188	7, 0.0002	34, 0.0036	736, 1.702	n/a
Steel piles, vibratory	172	1, <0.0001	3, <0.0001	n/a	29,286[1], 16.1

[1]This distance cannot actually be attained at the project location. The area presented is actual.

Table 2. Distances to relevant sound thresholds and areas of ensonification, airborne sound

Group	Threshold, re 20 µPa rms (unweighted)	Distance to threshold (m) and associated area of ensonification (km^2)	
		Impact driving	Vibratory driving
Harbor seals	90 dB	134, 0.0564	60, 0.0113
California sea lions	100 dB	42, 0.0055	19, 0.0011

There are no haul-out locations within the airborne harassment zones, which are encompassed by the zones estimated for underwater sound. Protective measures will be in place out to the distances calculated for the underwater thresholds, and the distances for the airborne thresholds will be covered fully by mitigation and monitoring measures in place for underwater sound thresholds. We recognize that pinnipeds in water that are within the area of ensonification for airborne sound could be incidentally taken by either underwater or airborne sound or both. We consider these incidences of harassment to be accounted for in the take estimates for underwater sound.

Comments and Responses

We published a notice of receipt of the Navy's application and proposed IHA in the Federal Register on May 22, 2013 (78 FR 30273). NMFS received comments from the Marine Mammal Commission (Commission). The Commission's comments and our responses are provided here, and the comments have been posted on the internet at: http://www.nmfs.noaa.gov/pr/permits/incidental.htm.

Comment 1: The Commission recommends that we require the Navy to re-estimate the number of harbor seal takes using more recent survey data from Tannenbaum et al. (2009, 2011), which is based on the total estimated population, rather than the Navy's methodology of reducing the density for the proportion of seals hauled out and older data.

Response: As described in greater detail in the FR notice, there are two sources of information from which a suitable density estimate may be derived for harbor seals. These include aerial surveys of Hood Canal (358.4 km^2) conducted in 1999 and vessel-based marine wildlife surveys conducted by the Navy in nearshore waters of NBKB (3.9 km^2) during July through September 2008 and November through May 2009-10. Despite the time lapse, these survey efforts produce comparable results. Because harbor seals, unlike sea lions, form a resident population in Hood Canal and are not known to be attracted to the NBKB waterfront by any foraging or haul-out opportunity, it is the opinion of both NMFS and the Navy that it is preferable to use the density value that is derived from a survey of the entire population. The Tannenbaum et al. (2009, 2011) data are not based on the total estimated population, but on surveys of a very small section of Hood Canal (approximately one percent of the Hood Canal area along the NBKB waterfront).

Based on the 1999 surveys, which also form the basis for the most recent abundance estimates provided in NMFS' Stock Assessment Report for the Washington inland waters stock of harbor seals, Jeffries et al. (2003) estimated the abundance of harbor seals in the Hood Canal as 1,088 individuals. The resulting density is 3.04 animals/km^2; however, use of this density in estimating take would make the assumption that 100 percent of the animals would be in the water at all times. Therefore, a factor derived from Huber et al. (2001) – only 35 percent of seals are in the water at any given time – was applied to correct for animals out of the water and not available to be exposed to underwater sound; the resulting corrected density of seals in the water at any given time is 1.06 animals/km^2.

The Commission disagrees with this approach because of their contention that (1) an instantaneous estimate of animals in the water at a given time does not produce an accurate

assessment of the number of individuals that may enter the water over the daily duration of the activity and (2) use of the uncorrected density would be consistent with our decision to base the number of takes of sea lions on average monthly maximum abundance estimates at NBKB haul-out sites, under the assumption that each individual present would enter the water and therefore be exposed to underwater sound that may result in behavioral harassment at some point on any given day. With regard to the second point, we note that consistency between approaches for sea lions and for harbor seals would not be appropriate. Sea lions are attracted to the NBKB waterfront by the presence of submarines and other haul-out opportunities. Site-specific data therefore better reflects the nature of sea lion occurrence than does a regional density.

With regard to the first point, as acknowledged in the FR notice (78 FR 30273; May 22, 2013), we recognize that over the course of a day, while the proportion of animals in the water may not vary significantly, different individuals may enter and exit the water. That is, it is probable that greater than 35 percent of seals will enter the water at some point during the day. No data exist regarding fine-scale harbor seal movements within the project area on time durations of less than a day, thus precluding an assessment of ingress or egress of different animals through the action area. As such, it is impossible, given available data, to determine exactly what number of individuals above 35 percent may potentially be exposed to underwater sound. Therefore, we are left to make a decision, on the basis of limited available information, regarding which of these two scenarios (i.e., 100 percent vs. 35 percent of harbor seals are in the water and exposed to sound) produces a more accurate estimate of the potential incidents of take.

First, we understand that hauled-out harbor seals are necessarily at haul-outs. No significant harbor seal haul-outs are located within or near the action area. Harbor seals observed in the vicinity of the NBKB shoreline are rarely hauled-out (for example, in formal surveys

during 2007-08, approximately 86 percent of observed seals were swimming), and when hauled-out, they do so opportunistically (i.e., on floating booms rather than established haul-outs). Harbor seals are typically unsuited for using manmade haul-outs at NBKB, which are used by sea lions. Primary harbor seal haul-outs in Hood Canal are located at significant distance (20 km or more) from the action area in Dabob Bay or further south (see Figure 4-1 in the Navy's application), meaning that animals casually entering the water from haul-outs or flushing due to some disturbance at those locations would not be exposed to underwater sound from the project; rather, only those animals embarking on foraging trips and entering the action area may be exposed.

Second, we know that harbor seals in Hood Canal are not likely to have a uniform distribution as is assumed through use of a density estimate, but are likely to be relatively concentrated near areas of interest such as the haul-outs found in Dabob Bay or foraging areas. The majority of the action area consists of the Level B harassment zone in deeper waters of Hood Canal; past observations from surveys and required monitoring have confirmed that harbor seals are less abundant in these waters.

Third, a typical pile driving day (in terms of the actual time spent driving) is much shorter than the 8-15 hours cited by the Commission as a representative pile driving day. Construction scheduling and notional production rates in concert with typical delays mean that hammers are active for only some small fraction of time on pile driving "days". For example, during the first year of construction for the second explosives handling wharf (EHW-2; a separate action occurring at NBKB), vibratory pile driving occurred on 75 days, but only for an approximate total time of 71 hours.

What we know tells us that (1) the turnover of harbor seals (in and out of the water) is occurring primarily outside the action area and would not be expected to result in a greater number of individuals entering the action area within a given day and being harassed than is assumed; (2) there are likely to be significantly fewer harbor seals in the majority of the action area than would be indicated by the uncorrected density; and (3) pile driving actually occurs over a limited timeframe on any given day, reducing the amount of time over which new individuals might enter the action area within a given day. These factors lead us to believe that the corrected density is likely to more closely approximate the number of seals that may be found in the action area than does the uncorrected density, and there are no existing data that would indicate that the proportion of individuals entering the water within the predicted area of effect during pile driving would be dramatically larger than 35 percent. Therefore, the Commission's suggestion that 100 percent of the population be used to estimate density would likely result in a gross exaggeration of potential take. Moreover, because the Navy is typically unable to determine from field observations whether the same or different individuals are being exposed, each observation is recorded as a new take, although an individual theoretically would only be considered as taken once in a given day.

Finally, we note that during the course of four previous IHAs over two years (2011-12), the Navy has been authorized for 6,725 incidents of incidental harassment (corrected for actual number of pile driving days). The total estimate of actual incidents of take (observed takes and observations extrapolated to unobserved area) was 868. This is almost certainly negatively biased, but the huge disparity does provide confirmation that we are not significantly underestimating takes.

Comment 2: The Commission recommends that we require the Navy to implement soft start procedures after 15 minutes if pile driving or removal is delayed or shut down because of the presence of a marine mammal within or approaching the shutdown zone.

Response: We do not believe the recommendation would be effective in reducing the number or intensity of incidents of harassment – in fact, we believe that implementation of this recommendation may actually increase the number of incidents of harassment by extending the overall project duration – while imposing a high cost in terms of operational practicability. We note here that, while the Commission recommends use of the measure to avoid serious injury (i.e., injury that will result in death of the animal), such an outcome is extremely unlikely even in the absence of any mitigation measures (as described in the FR notice at 78 FR 30273; May 22, 2013). Given that conclusion, we address our response to the potential usefulness of the measure in avoidance of non-serious injury (i.e., Level A harassment).

Soft start is required for the first impact pile driving of each day and, subsequently, after any impact pile driving stoppage of 30 minutes or greater. The purpose of a soft start is to provide a "warning" to animals by initiating the production of underwater sound at lower levels than are produced at full operating power. This warning is presumed to allow animals the opportunity to move away from an unpleasant stimulus and to potentially reduce the intensity of behavioral reactions to noise or prevent injury of animals that may remain undetected in the zone ensonified to potentially injurious levels. However, soft start requires additional time, resulting in a larger temporal footprint for the project. That is, soft start requires a longer cumulative period of pile driving (i.e., hours) but, more importantly, leads to a longer overall duration (i.e., more days on which pile driving occurs). In order to maximize the effectiveness of soft start while minimizing the implementation costs, we require soft start after a period of extended and

unobserved relative silence (i.e., at the beginning of the day, after the end of the required 30-minute post-activity monitoring period, or after 30 minutes with no impact driving). It is after these periods that marine mammals are more likely to closely approach the site (because it is relatively quiet) and less likely to be observed prior to initiation of the activity (because continuous monitoring has been interrupted).

The Commission justifies this recommendation on the basis of the potential for undetected animals to remain in the shutdown zone, and describes various biases (i.e., availability, detection, and perception) on an observer's ability to detect an animal. We do not believe that time is a factor in determining the influence of these biases on the probability of observing an animal in the shutdown zone. That is, an observer is not more likely to detect the presence of an animal at the 15-minute mark of continuous monitoring than after 30 minutes (it is established that soft start is required after any unmonitored period). Therefore, requiring soft start after 15 minutes (i.e., more soft starts) is not likely to result in increased avoidance of injury. Finally, we do not believe that the use of soft start may be expected to appreciably reduce the potential for injury where the probability of detection is high (e.g., small, shallow zones with good environmental conditions). Rather, the primary purpose of soft start under such conditions is to reduce the intensity of potential behavioral reactions to underwater sound in the disturbance zone.

As noted by the Commission, there are multiple reasons why marine mammals may remain in a shutdown zone and yet be undetected by observers. Animals are missed because they are underwater (availability bias) or because they are available to be seen, but are missed by observers (perception and detection biases) (e.g., Marsh and Sinclair, 1989). Negative bias on perception or detection of an available animal may result from environmental conditions,

limitations inherent to the observation platform, or observer ability. While missed detections are possible in theory, this would require that an animal would either (a) remain submerged (i.e., be unavailable) for periods of time approaching or exceeding 15 minutes and/or (b) remain undetected while at the surface. We provide further site-specific detail below.

First, environmental conditions in the Hood Canal are typically excellent and, unlike the moving aerial or vessel-based observation platforms for which detectability bias is often a concern, the observers here will be positioned in the most suitable locations to ensure high detectability (randomness of observations is not a concern, as it is for abundance sampling). We believe that the probability of detecting animals within the shutdown zones proposed for this action approaches 100 percent. The shutdown zones are small, with radial distances of only 10 m and 36 m for the 190- and 180-dB zones, respectively, while the 180 dB zone for cetaceans is notional only – no cetaceans have ever been recorded as entering the security area bounded by the floating port security barrier. Regarding availability, the most abundant species, and therefore the species most likely to be present in the mitigation zones, are the harbor seal and California sea lion.

It is generally unlikely that a pinniped would remain within 10 m of an active construction zone, in the absence of any known foraging opportunities or other attractant of any significance, for an extended period of time. However, some harbor seals have been known to frequent the areas surrounding existing wharves at NBKB. Even when this situation does occur, the possibility that individuals would remain submerged for a period of time exceeding 15 minutes is discountable.

Dive behavior for harbor seals, including typical duration, is influenced by a variety of factors, such as behavioral context, local bathymetric conditions, and the specific physiological

characteristics of the animal (e.g., Harkonen, 1987a,b; Eguchi and Harvey, 2005). Dive depth may be expected to correlate well with dive duration. However, Eguchi and Harvey (2005) showed that average dive durations in Monterey Bay, where available depths are much deeper than those in the nearshore environment at NBKB, were only 4.8 and 5.5 minutes for females and males, respectively. Although fine-scale population structure exists for harbor seals on a geographic basis from California to Alaska (Carretta et al., 2011), similar results have been obtained in Alaska and Washington. Dive durations for harbor seals from three locations across the Gulf of Alaska were typically less than 4 minutes across factors (Hastings et al., 2004). Closer to the action area in Puget Sound waters, Suryan and Harvey (1998) reported dive depths ranging from 3.2-4.6 min. Importantly, those durations were reduced in nearshore waters similar to those in the shutdown zone (1.5-3.6 min). Conversely, dive durations were somewhat longer during milling behavior, which is sometimes observed in the action area. However, surface intervals (which ranged from 0.6-0.9 min) showed a significantly positive correlation to dive duration (Suryan and Harvey, 1998), meaning that longer dives, or periods of high availability bias, are followed by periods of relatively greater availability.

Sea lions employ a shallow epipelagic foraging strategy, and numerous studies have reported mean dive times of approximately 2 minutes for California sea lions (e.g., Feldkamp et al., 1989 [mean dive time less than 3 min]; Weise et al., 2006 [mean dive time 1.9 ± 1.6 min]). Kuhn et al. (2003) cite published values for sea lion aerobic dive limits ranging from 2.3-5.8 minutes and, while it is possible that sea lions may dive beyond these limits when foraging on the benthos, significantly longer dive durations would not be expected in shallow waters. In addition, while short surface intervals are also possible, longer values are typical of data found in the literature for animals engaged in foraging (e.g., Costa et al. (2007) report a mean surface

interval of 1.6 minutes). Sea lions will typically spend a much greater proportion of time at the surface when not foraging, and behavioral observations in the nearshore action area show that California sea lions are typically traveling, likely to haul-out opportunities at Delta Pier.

Under the typically excellent observation conditions found in the Hood Canal, we believe that surfaced animals would be observed. Based on the foregoing factors, we have high confidence in the ability of observers to detect marine mammals in the shutdown zones estimated for this project in the Hood Canal.

Comment 3: The Commission recommends that we require the Navy to consult with the Washington State Department of Transportation and/or the California Department of Transportation to (1) determine whether soft start procedures can be used safely with the vibratory hammers that the Navy plans to use prior to eliminating the Navy's requirement to implement those measures and (2) clarify and troubleshoot the sound attenuation device implementation procedures to ensure the device's efficacy.

Response: We concur with the first part of the Commission's recommendation and will facilitate the suggested consultation. However, this cannot be accomplished prior to issuance of the IHA due to the Navy's operational needs. Accordingly, we deem vibratory soft starts to not currently be practicable due to safety concerns. We will determine whether the potentially significant human safety issue is inherent to implementation of the measure or is due to operator error prior to issuing any further IHAs to the Navy for pile driving activities in 2014 and beyond.

With regard to sound attenuation device implementation, we previously required the Navy to use such a device and to require that their contractors ensure: (1) that the device be capable of achieving attenuation performance of 10 dB of reduction and (2) that the device is properly deployed such that no reduction in performance may be attributable to operator error.

However, because recent observations indicate that achievement of 10 dB of attenuation performance may not be reasonable, we now stipulate simply that the Navy must make the necessary contractual requirements to ensure that the device is capable of achieving optimal performance, and that deployment of the device is implemented properly such that no reduction in performance may be attributable to faulty deployment. Compliance with this stipulation is incumbent upon the Navy and it would not be appropriate for us to dictate the manner of compliance, including requirements for consultation with third parties.

Comment 4: The Commission recommends that we require the Navy to monitor the extent of the disturbance zone using additional shore- or vessel-based observers throughout Hood Canal to (1) determine the numbers of marine mammals taken during pile driving and removal activities and (2) characterize the effects on those mammals.

Response: We believe that we have developed, in consultation with the Navy, a strategy that is appropriate to accomplish the stated objectives of the Commission's recommendation. The Commission states that the goal is not simply to employ a strategy that ensures monitoring out to a certain distance, but rather to employ a strategy that provides the information necessary to determine if the construction activities have adverse effects on marine mammals and to describe the nature and extent of those effects. We agree with that statement, and note that the Navy does not simply monitor within defined zones, ignoring occurrences outside those zones. The mitigation strategy is designed to implement shutdown of activity only for marine mammal occurrence within designated zones, but all observations of marine mammals and any observed behavior, whether construed as a reaction to project activity or not, are recorded regardless of distance to project activity. This information is coupled with the results of previous acoustic monitoring data (i.e., sound levels recorded at multiple defined

distances from the activity) to draw conclusions about the impact of the activity on marine mammals. Importantly, the larger monitoring effort conducted by the Navy in deeper waters of Hood Canal during their 2011 project monitoring was an important piece of the Navy's overall monitoring strategy for the ongoing suite of actions at NBKB and may reasonably be used as a reference for the current activities. Using that information, as well as the results of required monitoring associated with the 2011-12 Test Pile Program, 2011-13 rehabilitation of the existing Explosives Handling Wharf, and the first year of construction for the EHW-2, we believe we have gained an acceptable understanding of marine mammal behavior in response to the specified activities, as well as occurrence and behavior within the Level B harassment zone in deeper waters beyond the waterfront restricted area, which is intensively monitored. We also note that the de facto zone of monitoring effort has been expanded for this project, as observers monitoring the concurrent EHW-2 project will also be collecting information on occurrence and potential reactions of marine mammals.

The Commission urges us to consider a more comprehensive approach to assessment of effects of activities co-located in time and space. We believe that the Navy has designed a comprehensive, multi-year approach for its monitoring strategy. It is not fiscally feasible, or the best use of resources, to deploy multiple vessel-based observers for year after year of similar activities. A strategic approach demands front-loaded effort that, when properly designed, provides utility for subsequent years. Beginning in 2008, the Navy began to expand their efforts to better understand nature and frequency of occurrence for wildlife at NBKB. Opportunistic haul-out surveys and vessel-based wildlife surveys have been useful in evaluating the potential effects of construction activities. At the initiation of the recent construction activities, the Navy mounted an intensive monitoring effort, including deep-water monitoring that was not

mitigation-specific and comprehensive acoustic monitoring, with the express purpose of providing a robust body of data that would form a reference for evaluation of future effects of similar activities. In addition, the Navy has proactively secured funding and sought collaboration with NMFS and other experts to conduct future surveys of Washington inland waters that will provide much-needed updates to our understanding of marine mammal abundance and distribution in the region.

Comment 5: The Commission recommends that we complete an analysis of the impact of the proposed activities together with the cumulative impacts of all the other pertinent risk factors (including but not limited to the Navy's concurrent EHW-2 project) for marine mammals in the Hood Canal area.

Response: Section 101(a)(5)(D) of the MMPA requires NMFS to make a determination that the harassment incidental to a specified activity will have a negligible impact on the affected species or stocks of marine mammals, and will not result in an unmitigable adverse impact on the availability of marine mammals for taking for subsistence uses. Neither the MMPA nor NMFS' implementing regulations specify how to consider other activities and their impacts on the same populations. However, consistent with the 1989 preamble for NMFS' implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into the negligible impact analysis via their impacts on the environmental baseline (e.g., as reflected in the density/distribution and status of the species, population size and growth rate, and ambient noise).

In addition, cumulative effects were addressed in the Navy's Environmental Assessment prepared for this action, as well as in the NEPA analyses and biological opinions prepared for other actions conducted at the NBKB waterfront. These documents, as well as the relevant Stock

Assessment Reports, are part of NMFS' Administrative Record for this action, and provided the decision-maker with information regarding other activities in the action area that affect marine mammals, an analysis of cumulative impacts, and other information relevant to the determination made under the MMPA.

Comment 6: The Commission recommends that we encourage the Navy to combine future requests for IHAs for all activities that would occur in the same general area and within the same year rather than segmenting those activities and their associated impacts by requesting separate authorizations.

Response: We agree with the Commission's recommendation and have encouraged the Navy to do so. However, we do not have the statutory authority to require the Navy to combine such requests. With our encouragement, the Navy is working to develop a regionally comprehensive approach to environmental compliance for reasonably foreseeable small actions, such as pile replacement and repair projects. A major project such as the concurrent EHW-2 construction would likely remain as a standalone effort due to constraints related to planning, funding, and contracting.

Comment 7: The Commission recommends that we require the Navy to use the same data (e.g., source levels, sound attenuation factors, densities), methods, and justification for all pile driving and removal activities that occur during the same timeframe at NBKB.

Response: We concur with the Commission's recommendation and will require consistency from the Navy in future IHA requests. However, we are not overly concerned here because where there are inconsistencies they are due to use of conservative approaches. For example, in discussing source levels used for determining mitigation zones, the Commission notes that the Navy used a conservative estimate (i.e., the maximum source level) for the barge

mooring project, but did not do so for the EHW-2 project. While the approach differs, conservatism is also built into the estimation of mitigation zones for EHW-2, not through use of a conservative source level, but by using the maximum radial distances to relevant thresholds, as measured during in site-specific acoustic monitoring. The modeled zones for the EHW-2 project were 22 and 5 m for the 180 and 190 dB zones, respectively, but the zones required of the Navy are 85 and 20 m, respectively. This more conservative approach was adopted at the urging and with the concurrence of the Commission in 2012. The Commission states that it is unclear why these inconsistencies are present, however, in each case the reason for the inconsistency and the rationale for our decision that use of an inconsistent approach is acceptable, if not desirable, is clearly presented in the associated FR notices.

Description of Marine Mammals in the Area of the Specified Activity

There are seven marine mammal species, four cetaceans and three pinnipeds, which may inhabit or transit through the waters nearby NBKB in the Hood Canal. These include the transient killer whale, harbor porpoise, Dall's porpoise (Phocoenoides dalli dalli), Steller sea lion (eastern stock only; Eumetopias jubatus monteriensis), California sea lion, harbor seal, and humpback whale (Megaptera novaeangliae). The Steller sea lion and humpback whale are the only marine mammals that may occur within the Hood Canal that are listed under the Endangered Species Act (ESA); the humpback whale is listed as endangered and the eastern distinct population segment (DPS) of Steller sea lion is listed as threatened. The Steller sea lion is typically present in low numbers in the Hood Canal only from approximately October through mid-April. The humpback whale is not typically present in Hood Canal, with no confirmed sightings found in the literature or the Orca Network database (http://www.orcanetwork.org/) prior to January and February 2012, when one individual was observed repeatedly over a period

of several weeks. No sightings have been recorded since that time and we consider the humpback whale to be a rare visitor to Hood Canal at most. While the southern resident killer whale is resident to the inland waters of Washington and British Columbia, it has not been observed in the Hood Canal in over 15 years. Therefore, these three stocks were excluded from further analysis. The FR notice (78 FR 30273; May 22, 2013) summarizes the population status and abundance of these species, and the Navy's application provides detailed life history information.

Potential Effects of the Specified Activity on Marine Mammals

We have determined that pile driving, as outlined in the project description, has the potential to result in behavioral harassment of marine mammals that may be present in the project vicinity while construction activity is being conducted. Pile driving could potentially harass those pinnipeds that are in the water close to the project site, whether exposed to airborne or underwater sound. The FR notice (78 FR 30273; May 22, 2013) provides a detailed description of marine mammal hearing and of the potential effects of these construction activities on marine mammals.

Anticipated Effects on Habitat

The planned activities at NBKB will not result in permanent impacts to habitats used directly by marine mammals, such as haul-out sites, but may have potential short-term impacts to food sources such as forage fish and salmonids. There are no rookeries or major haul-out sites within 10 km (6.2 mi), foraging hotspots, or other ocean bottom structures of significant biological importance to marine mammals that may be present in the marine waters in the vicinity of the project area. Therefore, the main impact issue associated with the specified activity will be temporarily elevated sound levels and the associated direct effects on marine mammals, as discussed previously in this document. The most likely impact to marine mammal

habitat occurs from pile driving effects on likely marine mammal prey (i.e., fish) near NBKB and minor impacts to the immediate substrate during construction activity associated with the barge mooring project. The FR notice (78 FR 30273; May 22, 2013) describes these potential impacts in greater detail.

Mitigation

In order to issue an incidental take authorization (ITA) under Section 101(a)(5)(D) of the MMPA, we must, where applicable, set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses (where relevant).

Measurements from similar pile driving elsewhere at NBKB were coupled with practical spreading loss to estimate zones of influence (ZOIs; see "Estimated Take by Incidental Harassment"); these values were used to develop mitigation measures for pile driving activities at NBKB. The ZOIs effectively represent the mitigation zones that will be established around each pile to prevent Level A harassment to marine mammals, while providing estimates of the areas within which Level B harassment might occur. In addition to the measures described later in this section, the Navy will employ the following standard mitigation measures:

(a) Conduct briefings between construction supervisors and crews, marine mammal monitoring team, acoustical monitoring team, and Navy staff prior to the start of all pile driving activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

(b) Comply with applicable equipment sound standards and ensure that all construction equipment has sound control devices no less effective than those provided on the original equipment.

(c) For in-water heavy machinery work other than pile driving (using, e.g., standard barges, tug boats, barge-mounted excavators, or clamshell equipment used to place or remove material), if a marine mammal comes within 10 m, operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions. This type of work could include the following activities: (1) movement of the barge to the pile location; (2) positioning of the pile on the substrate via a crane (i.e., stabbing the pile); (3) removal of the pile from the water column/substrate via a crane (i.e., deadpull); or (4) the placement of sound attenuation devices around the piles. For these activities, monitoring will take place from 15 minutes prior to initiation until the action is complete.

Monitoring and Shutdown for Pile Driving

The following measures will apply to the Navy's mitigation through shutdown and disturbance zones:

Shutdown Zone – For all pile driving and removal activities, the Navy will establish a shutdown zone intended to contain the area in which SPLs equal or exceed the 180/190 dB rms acoustic injury criteria. The purpose of a shutdown zone is to define an area within which shutdown of activity will occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area), thus preventing injury, serious injury, or death of marine mammals. Radial distances for shutdown zones are shown in Table 1. However, a minimum shutdown zone of 10 m will be established during all pile driving and removal activities, regardless of the estimated zone. These precautionary measures are intended to prevent the

already unlikely possibility of physical interaction with construction equipment and to further reduce any possibility of acoustic injury.

Disturbance Zone – Disturbance zones are the areas in which SPLs equal or exceed 160 and 120 dB rms (for pulsed and non-pulsed sound, respectively). Disturbance zones provide utility for monitoring conducted for mitigation purposes (i.e., shutdown zone monitoring) by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring of disturbance zones enables observers to be aware of and communicate the presence of marine mammals in the project area but outside the shutdown zone and thus prepare for potential shutdowns of activity. However, the primary purpose of disturbance zone monitoring is for documenting incidents of Level B harassment; disturbance zone monitoring is discussed in greater detail later (see "Monitoring and Reporting"). Nominal radial distances for disturbance zones are shown in Tables 1 and 2. Given the size of the disturbance zone for vibratory pile driving, it is impossible to guarantee that all animals will be observed or to make comprehensive observations of fine-scale behavioral reactions to sound, and only a portion of the zone (e.g., what may be reasonably observed by visual observers stationed within the waterfront restricted area [WRA]) will be monitored.

In order to document observed incidences of harassment, monitors record all marine mammal observations, regardless of location. The observer's location, as well as the location of the pile being driven, is known from a GPS. The location of the animal is estimated as a distance from the observer, which is then compared to the location from the pile. If acoustic monitoring is being conducted for that pile, a received SPL may be estimated, or the received level may be estimated on the basis of past or subsequent acoustic monitoring. It may then be determined whether the animal was exposed to sound levels constituting incidental harassment in post-

processing of observational and acoustic data, and a precise accounting of observed incidences of harassment created. Therefore, although the predicted distances to behavioral harassment thresholds are useful for estimating incidental harassment for purposes of authorizing levels of incidental take, actual take may be determined in part through the use of empirical data. That information may then be used to extrapolate observed takes to reach an approximate understanding of actual total takes.

Monitoring Protocols – Monitoring will be conducted before, during, and after pile driving activities. In addition, observers shall record all incidences of marine mammal occurrence, regardless of distance from activity, and shall document any behavioral reactions in concert with distance from piles being driven. Observations made outside the shutdown zone will not result in shutdown; that pile segment will be completed without cessation, unless the animal approaches or enters the shutdown zone, at which point all pile driving activities will be halted. Monitoring will take place from 15 minutes prior to initiation through 30 minutes post-completion of pile driving activities. Pile driving activities include the time to remove a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is no more than 30 minutes. Please see the Marine Mammal Monitoring Plan (available at http://www.nmfs.noaa.gov/pr/permits/incidental.htm), developed by the Navy in agreement with us, for full details of the monitoring protocols.

The following additional measures apply to visual monitoring:

(1) Monitoring will be conducted by qualified observers, who will be placed at the best vantage point(s) practicable to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the hammer operator. Qualified observers are trained biologists, with the following minimum qualifications:

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance; use of binoculars may be necessary to correctly identify the target;
- Advanced education in biological science, wildlife management, mammalogy, or related fields (bachelor's degree or higher is required);
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience);
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates and times when in-water construction activities were suspended to avoid potential incidental injury from construction sound of marine mammals observed within a defined shutdown zone; and marine mammal behavior; and
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.

(2) Prior to the start of pile driving activity, the shutdown zone will be monitored for 15 minutes to ensure that it is clear of marine mammals. Pile driving will only commence once observers have declared the shutdown zone clear of marine mammals; animals will be allowed to remain in the shutdown zone (i.e., must leave of their own volition) and their behavior will be

monitored and documented. The shutdown zone may only be declared clear, and pile driving started, when the entire shutdown zone is visible (i.e., when not obscured by dark, rain, fog, etc.). In addition, if such conditions should arise during impact pile driving that is already underway, the activity will be halted.

(3) If a marine mammal approaches or enters the shutdown zone during the course of pile driving operations, activity will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal. Monitoring will be conducted throughout the time required to drive a pile.

Sound Attenuation Devices

Bubble curtains shall be used during all impact pile driving. The device will distribute air bubbles around 100 percent of the piling perimeter for the full depth of the water column, and the lowest bubble ring shall be in contact with the mudline for the full circumference of the ring. Testing of the device by comparing attenuated and unattenuated strikes is not possible because of requirements in place to protect marbled murrelets (an ESA-listed bird species under the jurisdiction of the USFWS). However, in order to avoid loss of attenuation from design and implementation errors in the absence of such testing, a performance test of the device shall be conducted prior to initial use. The performance test shall confirm the calculated pressures and flow rates at each manifold ring. In addition, the contractor shall also train personnel in the proper balancing of air flow to the bubblers and shall submit an inspection/performance report to the Navy within 72 hours following the performance test.

Timing Restrictions

In Hood Canal, designated timing restrictions exist for pile driving activities to avoid in-water work when salmonids and other spawning forage fish are likely to be present. The in-water work window is July 16-February 15. The barge mooring project will occur during a portion of that period, from July 16-September 30. During the majority of this timeframe, impact pile driving will only occur starting two hours after sunrise and ending two hours before sunset due to marbled murrelet nesting season. After September 23, in-water construction activities will occur during daylight hours (sunrise to sunset).

Soft Start

The use of a soft-start procedure is believed to provide additional protection to marine mammals by warning or providing a chance to leave the area prior to the hammer operating at full capacity, and typically involves a requirement to initiate sound from vibratory hammers for fifteen seconds at reduced energy followed by a 30-second waiting period. This procedure is repeated two additional times. However, implementation of soft start for vibratory pile driving during previous pile driving work at NBKB has led to equipment failure and serious human safety concerns; those issues were detailed in the FR notice (78 FR 30273; May 22, 2013). Therefore, vibratory soft start is not required as a mitigation measure for this project, as we have determined it to not currently be practicable due to safety concerns. We have further determined this measure unnecessary to providing the means of effecting the least practicable impact on marine mammals and their habitat. For impact driving, soft start will be required, and contractors will provide an initial set of strikes from the impact hammer at reduced energy, followed by a 30-second waiting period, then two subsequent reduced energy strike sets. The reduced energy of an individual hammer cannot be quantified because of variation in individual drivers. The actual number of strikes at reduced energy will vary because operating the hammer at less than full

power results in "bouncing" of the hammer as it strikes the pile, resulting in multiple "strikes". Soft start for impact driving will be required at the beginning of each day's pile driving work and at any time following a cessation of impact pile driving of 30 minutes or longer.

We have carefully evaluated the applicant's mitigation measures and considered a range of other measures in the context of ensuring that we prescribe the means of effecting the least practicable impact on the affected marine mammal species and stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to one another: (1) the manner in which, and the degree to which, the successful implementation of the measure is expected to minimize adverse impacts to marine mammals; (2) the proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and (3) the practicability of the measure for applicant implementation, including consideration of personnel safety, and practicality of implementation.

Based on our evaluation of the applicant's planned measures, as well as any other potential measures that may be relevant to the specified activity, we have determined that these mitigation measures provide the means of effecting the least practicable impact on marine mammal species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Monitoring and Reporting

In order to issue an ITA for an activity, section 101(a)(5)(D) of the MMPA states that we must, where applicable, set forth "requirements pertaining to the monitoring and reporting of such taking". The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for ITAs must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or

impacts on populations of marine mammals that are expected to be present in the proposed action area. Please see the Navy's Marine Mammal Monitoring Plan for full details of the requirements for monitoring and reporting.

Visual Marine Mammal Observations

The Navy will collect sighting data and behavioral responses to construction for marine mammal species observed in the region of activity during the period of activity. All observers will be trained in marine mammal identification and behaviors and are required to have no other construction-related tasks while conducting monitoring. The Navy will monitor the shutdown zone and disturbance zone before, during, and after pile driving, with observers located at the best practicable vantage points. Based on our requirements, the Navy will implement the following procedures for pile driving:

- MMOs will be located at the best vantage point(s) in order to properly see the entire shutdown zone and as much of the disturbance zone as possible.
- During all observation periods, observers will use binoculars and the naked eye to search continuously for marine mammals.
- If the shutdown zones are obscured by fog or poor lighting conditions, pile driving at that location will not be initiated until that zone is visible. Should such conditions arise while impact driving is underway, the activity will be halted.
- The shutdown and disturbance zones around the pile will be monitored for the presence of marine mammals before, during, and after any pile driving or removal activity.

Individuals implementing the monitoring protocol will assess its effectiveness using an adaptive approach. Monitoring biologists will use their best professional judgment throughout

implementation and seek improvements to these methods when deemed appropriate. Any modifications to protocol will be coordinated between NMFS and the Navy.

Data Collection

We require that observers use approved data forms. Among other pieces of information, the Navy will record detailed information about any implementation of shutdowns, including the distance of animals to the pile and description of specific actions that ensued and resulting behavior of the animal, if any. In addition, the Navy will attempt to distinguish between the number of individual animals taken and the number of incidences of take. We require that, at a minimum, the following information be collected on the sighting forms:

- Date and time that monitored activity begins or ends;
- Construction activities occurring during each observation period;
- Weather parameters (e.g., percent cover, visibility);
- Water conditions (e.g., sea state, tide state);
- Species, numbers, and, if possible, sex and age class of marine mammals;
- Description of any observable marine mammal behavior patterns, including bearing and direction of travel, and if possible, the correlation to SPLs;
- Distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;
- Locations of all marine mammal observations; and
- Other human activity in the area.

Reporting

A draft report will be submitted to NMFS within 90 working days of the completion of marine mammal monitoring. The report will include marine mammal observations pre-activity, during-activity, and post-activity during pile driving days, and will also provide descriptions of any adverse responses to construction activities by marine mammals and a complete description of all mitigation shutdowns and the results of those actions and a refined take estimate based on the number of marine mammals observed during the course of construction. A final report will be prepared and submitted within 30 days following resolution of comments on the draft report.

Estimated Take by Incidental Harassment

With respect to the activities described here, the MMPA defines "harassment" as: “any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].”

All anticipated takes will be by Level B harassment, involving temporary changes in behavior. The planned mitigation and monitoring measures are expected to minimize the possibility of injurious or lethal takes such that take by Level A harassment, serious injury or mortality is considered discountable. However, it is unlikely that injurious or lethal takes would occur even in the absence of the planned mitigation and monitoring measures.

If a marine mammal responds to a stimulus by changing its behavior (e.g., through relatively minor changes in locomotion direction/speed or vocalization behavior), the response may or may not constitute taking at the individual level, and is unlikely to affect the stock or the species as a whole. However, if a sound source displaces marine mammals from an important

feeding or breeding area for a prolonged period, impacts on animals or on the stock or species could potentially be significant (Lusseau and Bejder, 2007; Weilgart, 2007). Given the many uncertainties in predicting the quantity and types of impacts of sound on marine mammals, it is common practice to estimate how many animals are likely to be present within a particular distance of a given activity, or exposed to a particular level of sound. This practice potentially overestimates the numbers of marine mammals taken. For example, during the past ten years, killer whales have been observed within the project area twice. On the basis of that information, an estimated amount of potential takes for killer whales is presented here. However, while a pod of killer whales could potentially visit again during the project timeframe, and thus be taken, it is more likely that they will not. Although incidental take of killer whales and Dall's porpoises was authorized for 2011-12 activities at NBKB on the basis of past observations of these species, no such takes were recorded and no individuals of these species were observed. Similarly, estimated actual take levels (observed takes extrapolated to the remainder of unobserved but ensonified area) were significantly less than authorized levels of take for the remaining species.

The project area is not believed to be particularly important habitat for marine mammals, nor is it considered an area frequented by marine mammals, although harbor seals are year-round residents of Hood Canal and sea lions are known to haul-out on submarines and other man-made objects at the NBKB waterfront (although typically at a distance of a mile or greater from the project site). Therefore, behavioral disturbances that could result from anthropogenic sound associated with these activities are expected to affect only a relatively small number of individual marine mammals, although those effects could be recurring over the life of the project if the same individuals remain in the project vicinity.

The Navy has requested authorization for the incidental taking of small numbers of California sea lions, harbor seals, transient killer whales, and harbor porpoises in the Hood Canal that may result from pile driving during construction activities associated with the barge mooring project described previously in this document.

The humpback whale is not expected to occur in the project area, and Steller sea lions are not expected to occur during the project timeframe. The earliest documented occurrence of Steller sea lions at NBKB occurred on September 30, 2010, when five individuals were observed at Delta Pier during daily surveys. During monitoring associated with the 2011 TPP, Steller sea lions were documented as arriving on October 8, but had not previously been regularly observed prior to November.

Marine Mammal Densities

For all species, the best scientific information available was used to derive density estimates and the maximum appropriate density value for each species for each site was used in the marine mammal take assessment calculation. These values were derived or confirmed by experts convened to develop such information for use in Navy environmental compliance efforts in the Pacific Northwest (Navy, 2013). For harbor seals, this involved published literature describing harbor seal research conducted in Washington and Oregon as well as more specific counts conducted in Hood Canal (Huber et al., 2001; Jeffries et al., 2003). The best information available for the remaining species in Hood Canal came from surveys conducted by the Navy at the NBKB waterfront or in the vicinity of the project area.

Beginning in April 2008, Navy personnel have recorded sightings of marine mammals occurring at known haul-outs along the NBKB waterfront, including docked submarines or other structures associated with NBKB docks and piers and the nearshore pontoons of the floating

security fence. Sightings of marine mammals within the waters adjoining these locations were also recorded. Sightings were attempted whenever possible during a typical work week (i.e., Monday through Friday), but inclement weather, holidays, or security constraints often precluded surveys. These sightings took place frequently, although without a formal survey protocol. During the surveys, staff visited each of the above-mentioned locations and recorded observations of marine mammals. Surveys were conducted using binoculars and the naked eye from shoreline locations or the piers/wharves themselves. Because these surveys consist of opportunistic sighting data from shore-based observers, largely of hauled-out animals, there is no associated survey area appropriate for use in calculating a density from the abundance data. Data were compiled for the period from April 2008 through December 2012 for analysis in this IHA, and these data provide the basis for take estimation for California sea lions. Please note that, although we erroneously stated in the FR notice that data were compiled only through November 2011, the data actually displayed in Table 6 of that document was indeed compiled through December 2012. Other information, including sightings data from other Navy survey efforts at NBKB, is available for this species, but these data provide the most conservative (i.e., highest) local abundance estimates (and thus the highest estimates of potential take).

In addition, vessel-based marine wildlife surveys were conducted according to established survey protocols during July through September 2008 and November through May 2009-10 (Tannenbaum et al., 2009, 2011). Eighteen complete surveys of the nearshore area resulted in observations of four marine mammal species (harbor seal, California sea lion, harbor porpoise, and Dall's porpoise). These surveys operated along pre-determined transects parallel to the shoreline from the nearshore out to approximately 1,800 ft (549 m) from shoreline, at a spacing of 100 yd, and covered the entire NBKB waterfront (approximately 3.9 km^2 per survey)

at a speed of 5 kn or less. Two observers recorded sightings of marine mammals both in the water and hauled out, including date, time, species, number of individuals, age (juvenile, adult), behavior (swimming, diving, hauled out, avoidance dive), and haul-out location. Positions of marine mammals were obtained by recording distance and bearing to the animal with a rangefinder and compass, noting the concurrent location of the boat with GPS, and, subsequently, analyzing these data to produce coordinates of the locations of all animals detected. These surveys resulted in the only observation of a Dall's porpoise near NBKB.

The Navy also conducted vessel-based line transect surveys in Hood Canal on non-construction days during the 2011 TPP in order to collect additional data for species present in Hood Canal. These surveys detected three marine mammal species (harbor seal, California sea lion, and harbor porpoise), and included surveys conducted in both the main body of Hood Canal, near the project area, and baseline surveys conducted for comparison in Dabob Bay, an area of Hood Canal that is not affected by sound from Navy actions at the NBKB waterfront. The surveys operated along pre-determined transects that followed a double saw-tooth pattern to achieve uniform coverage of the entire NBKB waterfront. The vessel traveled at a speed of approximately 5 kn when transiting along the transect lines. Two observers recorded sightings of marine mammals both in the water and hauled out, including the date, time, species, number of individuals, and behavior (swimming, diving, etc.). Positions of marine mammals were obtained by recording the distance and bearing to the animal(s), noting the concurrent location of the boat with GPS, and subsequently analyzing these data to produce coordinates of the locations of all animals detected. Sighting information for harbor porpoises was corrected for detectability (g(0) = 0.54; Barlow, 1988; Calambokidis et al., 1993; Carretta et al., 2001). Distance sampling

methodologies were used to estimate densities of animals for the data. This information provides the best information for harbor porpoises.

The cetaceans, as well as the harbor seal, appear to range throughout Hood Canal; therefore, the analysis in this proposed IHA assumes that harbor seal, transient killer whale, harbor porpoise, and Dall's porpoise are uniformly distributed in the project area. However, it should be noted that there have been no observations of cetaceans within the floating security barriers at NBKB; these barriers thus appear to effectively prevent cetaceans from approaching the shutdown zones. Although the Navy will implement a precautionary shutdown zone for cetaceans, anecdotal evidence suggests that cetaceans are not at risk of Level A harassment at NBKB even from louder activities (e.g., impact pile driving). The California sea lion does not appear to utilize most of Hood Canal. The sea lions appear to be attracted to the man-made haul-out opportunities along the NBKB waterfront while dispersing for foraging opportunities elsewhere in Hood Canal. California sea lions were not reported during aerial surveys of Hood Canal (Jeffries et al., 2000).

Description of Take Calculation

The take calculations presented here rely on the best data currently available for marine mammal populations in the Hood Canal. The formula was developed for calculating take due to pile driving activity and applied to each group-specific sound impact threshold. The formula is founded on the following assumptions:

- Mitigation measures (e.g., bubble curtain) will be utilized, as discussed previously;
- All marine mammal individuals potentially available are assumed to be present within the relevant area, and thus incidentally taken;

- An individual can only be taken once during a 24-h period; and,
- There were will be twenty total days of activity.
- Exposures to sound levels above the relevant thresholds equate to take, as defined by the MMPA.

The calculation for marine mammal takes is estimated by:

Exposure estimate = (n * ZOI) * days of total activity

where:

n = density estimate used for each species/season

ZOI = sound threshold ZOI impact area; the area encompassed by all locations where the SPLs equal or exceed the threshold being evaluated

n * ZOI produces an estimate of the abundance of animals that could be present in the area for exposure, and is rounded to the nearest whole number before multiplying by days of total activity.

The ZOI impact area is the estimated range of impact to the sound criteria. The distances specified in Table 1 were used to calculate ZOIs around each pile. All impact pile driving take calculations were based on the estimated threshold ranges assuming attenuation of 8 dB from use of a bubble curtain. The ZOI impact area took into consideration the possible affected area of the Hood Canal from the pile driving site furthest from shore with attenuation due to land shadowing from bends in the canal. Because of the close proximity of some of the piles to the shore, the narrowness of the canal at the project area, and the maximum fetch, the ZOIs for each threshold are not necessarily spherical and may be truncated.

While pile driving can occur any day throughout the in-water work window, and the analysis is conducted on a per day basis, only a fraction of that time (typically a matter of hours

on any given day) is actually spent pile driving. Acoustic monitoring conducted as part of the TPP demonstrated that Level B harassment zones for vibratory pile driving are likely to be significantly smaller than the zones estimated through modeling based on measured source levels and practical spreading loss. Also of note is the fact that the effectiveness of mitigation measures in reducing takes is typically not quantified in the take estimation process. Here, we do explicitly account for an assumed level of efficacy for use of the bubble curtain, but not for the soft start associated with impact driving. In addition, equating exposure with response (i.e., a behavioral response meeting the definition of take under the MMPA) is simplistic and conservative assumption. For these reasons, these take estimates are likely to be conservative.

Airborne Sound – No incidents of incidental take resulting solely from airborne sound are likely, as distances to the harassment thresholds will not reach areas where pinnipeds may haul out. Harbor seals can haul out at a variety of natural or manmade locations, but the closest known harbor seal haul-out is at the Dosewallips River mouth (London, 2006) and Navy waterfront surveys and boat surveys have found it rare for harbor seals to haul out along the NBKB waterfront (Agness and Tannenbaum, 2009; Tannenbaum et al., 2009, 2011; Navy, 2010). Individual seals have occasionally been observed hauled out on pontoons of the floating security fence within the restricted areas of NBKB, but this area is not with the airborne disturbance ZOI. The Service Pier is elevated at least twenty feet above the surface of the water and is inaccessible to pinnipeds, and seals have not been observed hauled out on the floating Port Operations pier sections or on the shoreline adjacent to the Service Pier. Sea lions typically haul out on submarines docked at Delta Pier, approximately one mile from the project site.

We recognize that pinnipeds in the water could be exposed to airborne sound that may result in behavioral harassment when looking with heads above water. However, these animals

will previously have been 'taken' as a result of exposure to underwater sound above the behavioral harassment thresholds, which are in all cases larger than those associated with airborne sound. Thus, the behavioral harassment of these animals is already accounted for in these estimates of potential take. Multiple incidents of exposure to sound above NMFS' thresholds for behavioral harassment are not believed to result in increased behavioral disturbance, in either nature or intensity of disturbance reaction. Therefore, we do not believe that authorization of incidental take resulting from airborne sound for pinnipeds is warranted.

California Sea Lion – California sea lions occur regularly in the vicinity of the project site from August through mid-June, as determined by Navy waterfront surveys conducted from April 2008 through December 2012 (Table 3). With regard to the range of this species in Hood Canal and the project area, it is assumed on the basis of waterfront observations (Agness and Tannenbaum, 2009; Tannenbaum et al., 2009, 2011) that the opportunity to haul out on submarines docked at Delta Pier is a primary attractant for California sea lions in Hood Canal, as they are not typically observed elsewhere in Hood Canal. Their haul-out sites are not within the largest underwater ZOI, because sound will encounter land before reaching the haul-out site (see Figure 6-2 in the Navy's application). Abundance is calculated as the monthly average of the maximum number observed in a given month, as opposed to the overall average (Table 3). That is, the maximum number of animals observed on any one day in a given month was averaged for 2008-12, providing a monthly average of the maximum daily number observed. The largest monthly average (58 animals) was recorded in November, as was the largest single daily count (81 in 2011). The first California sea lion was observed at NBKB in August 2009, and their occurrence has been increasing since that time (Navy, 2012).

California sea lion density for Hood Canal was calculated to be 0.28 animals/km^2 for purposes of the Navy Marine Species Density Database (Navy, 2013). However, this density was derived by averaging data collected year-round. This project will occur during the months when California sea lions are the least abundant in Hood Canal, so it is more appropriate to use data collected at the NBKB waterfront during those months (August-September; we exclude July because it is likely that the majority of work will occur in August and September). In addition, local observations show that sea lions are attracted to haul-out opportunities at NBKB, resulting in greater local abundance than is indicated by the NMSDD density value. In our analysis contained in the FR notice (78 FR 30273; May 22, 2013), and based on the Navy's request for take authorization, we considered the highest number of individual California sea lions observed hauled out at NBKB during the July-September timeframe (i.e., 33), which occurred at the end of September 2010. Exposures were calculated assuming 33 individuals could be present, and therefore exposed to sound exceeding the behavioral harassment threshold, on each day of pile driving. We noted in that document that this was an extremely conservative methodology, but chose to carry it forward. However, in subsequent discussions with the Marine Mammal Commission, we determined that this conservative methodology was likely unwarranted and resulted in unrealistic take estimates (i.e., a much greater take estimate for California sea lions than for harbor seals), given the observed primacy of harbor seals in waterfront observations for other actions at NBKB. Therefore, we have determined that it is more appropriate to use the monthly average from August-September, which considers the much lower observed abundances from August and early September (when the majority of project activity is likely to be completed). We still conservatively assume that all individuals potentially present (i.e., seven individuals; see Table 3) will be taken on any given day of activity.

Table 3. California sea lion sighting information from NBKB, April 2008-December 2012

Month	Number of surveys	Number of surveys with animals present	Frequency of presence[1]	Abundance[2]
January	47	36	0.77	31.0
February	50	43	0.86	38.0
March	47	45	0.96	53.3
April	67	55	0.82	45.4
May	72	58	0.81	29.4
June	73	17	0.23	7.4
July	61	1	0.02	0.6
August	65	12	0.18	2.6
September	54	31	0.57	20.4
October	65	61	0.94	51.8
November	56	56	1	60.2
December	54	44	0.81	49.6
Total or average (Aug-Sep only)	**119**	**43**	**0.36**	**10.7**

Totals (number of surveys) and averages (frequency and abundance) presented for project period (August-September) only. Information from other months presented for reference. Average abundance is weighted by monthly survey effort.

[1] Frequency is the number of surveys with California sea lions present/number of surveys conducted.

[2] Abundance is calculated as the monthly average of the maximum daily number observed in a given month.

Harbor Seal – Jeffries et al. (2003) conducted aerial surveys of the harbor seal population in Hood Canal in 1999 for the Washington Department of Fish and Wildlife and reported 711 harbor seals hauled out. The authors adjusted this abundance with a correction factor of 1.53 to account for seals in the water, which were not counted, and estimated that there were 1,088 harbor seals in Hood Canal. The correction factor (1.53) was based on the proportion of time seals spend on land versus in the water over the course of a day, and was derived by dividing one by the percentage of time harbor seals spent on land. These data came from tags (VHF transmitters) applied to harbor seals at six areas (Grays Harbor, Tillamook Bay, Umpqua River, Gertrude Island, Protection/Smith Islands, and Boundary Bay, BC) within two different harbor seal stocks (the coastal stock and the inland waters of WA stock) over four survey years. The Hood Canal population is part of the inland waters stock, and while not specifically sampled, Jeffries et al. (2003) found the VHF data to be broadly applicable to the entire stock. The tagging

research in 1991 and 1992 conducted by Huber et al. (2001) and Jeffries et al. (2003) used the same methods for the 1999 and 2000 survey years. These surveys indicated that approximately 35 percent of harbor seals are in the water versus hauled out on a daily basis (Huber et al., 2001; Jeffries et al., 2003). Exposures were calculated using a density derived from the number of harbor seals that are present in the water at any one time (35 percent of 1,088, or approximately 381 individuals), divided by the area of the Hood Canal (358.44 km^2) and the formula presented previously. The aforementioned area of Hood Canal represents a change from that cited previously for authorizations associated with Navy activities in Hood Canal, and represents a correction to our understanding of the methodology used in Jeffries et al. (2003).

We recognize that over the course of the day, while the proportion of animals in the water may not vary significantly, different individuals may enter and exit the water. However, fine-scale data on harbor seal movements within the project area on time durations of less than a day are not available. Previous monitoring experience from Navy actions conducted from in the same project area has indicated that this density provides an appropriate estimate of potential exposures. However, the density of harbor seals calculated in this manner (1.06 animals/km^2) is corroborated by results of the Navy's vessel-based marine mammal surveys at NBKB in 2008 and 2009-10, in which an average of five individual harbor seals per survey was observed in the 3.9 km^2 survey area (density = 1.3 animals/km^2) (Tannenbaum et al., 2009, 2011).

Killer Whales – Transient killer whales are uncommon visitors to Hood Canal, and may be present anytime during the year. Transient pods (six to eleven individuals per event) were observed in Hood Canal for lengthy periods of time (59-172 days) in 2003 (January-March) and 2005 (February-June), feeding on harbor seals (London, 2006). These whales used the entire expanse of Hood Canal for feeding. West Coast transient killer whales most often travel in small

pods (Baird and Dill 1996). Houghton reported to the Navy, from unpublished data, that the most commonly observed group size in Puget Sound (defined as from Admiralty Inlet south and up through Skagit Bay) from 2004-2010 data is six whales.

The density value derived for the Navy Marine Species Density Database is 0.0019 animals/km^2 (Navy, 2013), which would result in a prediction that zero animals will be harassed by the project activities. However, while transient killer whales are rare in the Hood Canal, it is possible that a pod of animals could be present. In the event that this occurred, the animals would not assume a uniform distribution as is implied by the density estimate. Therefore, we conservatively assume that a single pod of whales (defined as six whales) could be present in the vicinity of the project for the entire duration.

Dall's Porpoise

Dall's porpoises may be present in the Hood Canal year-round and could occur as far south as the project site. Their use of inland Washington waters, however, is mostly limited to the Strait of Juan de Fuca. One individual has been observed by Navy staff in deeper waters of Hood Canal (Tannenbaum et al., 2009, 2011). The Navy Marine Species Density Database assumes a negligible value of 0.001 animals/1,000 km^2 for Dall's porpoises in the Hood Canal, which represents species that have historically been observed in an area but have no regular presence. Use of this density value results in a prediction that zero animals will be exposed to sound above the behavioral harassment threshold, and the Navy has not requested any take authorization for Dall's porpoises.

Harbor Porpoise

During vessel-based line transect surveys on non-construction days during the TPP, harbor porpoises were frequently sighted within several kilometers of the base, mostly to the

north or south of the project area, but occasionally directly across from the Bangor waterfront on the far side of Toandos Peninsula. Harbor porpoise presence in the immediate vicinity of the base (i.e., within 1 km) remained low. These data were used to generate a density for Hood Canal. Based on guidance from other line transect surveys conducted for harbor porpoises using similar monitoring parameters (e.g., boat speed, number of observers) (Barlow, 1988; Calambokidis et al., 1993; Caretta et al., 2001), the Navy determined the effective strip width for the surveys to be one kilometer, or a perpendicular distance of 500 m from the transect to the left or right of the vessel. The effective strip width was set at the distance at which the detection probability for harbor porpoises was equivalent to one, which assumes that all individuals on a transect are detected. Only sightings occurring within the effective strip width were used in the density calculation. By multiplying the trackline length of the surveys by the effective strip width, the total area surveyed during the surveys was 471.2 km^2. Thirty-eight individual harbor porpoises were sighted within this area, resulting in a density of 0.0806 animals per km^2. To account for availability bias, or the animals which are unavailable to be detected because they are submerged, the Navy utilized a g(0) value of 0.54, derived from other similar line transect surveys (Barlow, 1988; Calambokidis et al., 1993; Carretta et al., 2001). This resulted in a corrected density of 0.149 harbor porpoises per km^2. For comparison, 274.27 km^2 of trackline survey effort in nearby Dabob Bay produced a corrected density estimate of 0.203 harbor porpoises per km^2.

Table 4. Number of Potential Incidental Takes of Marine Mammals within Various Acoustic Threshold Zones

Species	Density	Underwater		Total Authorized Takes
		Impact injury threshold[1]	Vibratory disturbance threshold (120 dB)[2]	
California sea lion	0.28[4]	0	220	**220**

Harbor seal	1.06	0	340	**340**
Killer whale	0.0019[5]	0	120	**120**
Dall's porpoise	0.000001	0	0	**0**
Harbor porpoise	0.149	0	40	**40**

[1] Acoustic injury threshold for impact pile driving is 190 dB for pinnipeds and 180 dB for cetaceans.

[2] Impact pile driving will always occur on the same day as vibratory pile driving, and the 160-dB acoustic harassment zone associated with impact pile driving is considered subsumed by the 120-dB harassment zone produced by vibratory driving. Therefore, takes are not calculated separately for the two zones.

[4] A maximum abundance estimate of 11 animals present per day during the project timeframe was used for take estimation.

[5] Here we assume that a single pod of transient killer whales (defined as six whales) may be present for the duration of the work period (twenty days).

Negligible Impact and Small Numbers Analysis and Determinations

NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival." In making a negligible impact determination, NMFS considers a variety of factors, including but not limited to: (1) the number of anticipated mortalities; (2) the number and nature of anticipated injuries; (3) the number, nature, intensity, and duration of Level B harassment; and (4) the context in which the take occurs.

Small Numbers Analysis

The proposed numbers of animals authorized to be taken for California sea lions, harbor seals, and harbor porpoise would be considered small relative to the relevant stocks or populations (less than one percent for California sea lions and harbor porpoise and less than three percent for harbor seals) even if each estimated taking occurred to a new individual – an extremely unlikely scenario, as, for pinnipeds occurring at the NBKB waterfront, there will

almost certainly be some overlap in individuals present day-to-day. Further, for the pinniped species, these takes could potentially occur only within some small portion of the overall regional stock. Of the estimated 296,500 California sea lions, only certain adult and subadult males – believed to number approximately 3,000-5,000 by Jeffries et al. (2000) – travel north during the non-breeding season. That number has almost certainly increased with the population of California sea lions – the 2000 Stock Assessment Report for California sea lions reported an estimated population size of 204,000-214,000 animals – but likely remains a relatively small portion of the overall population. For harbor seals, animals found in Hood Canal belong to a closed, resident population estimated at approximately 1,000 animals by Jeffries et al. (2003), and takes are likely to occur only within some portion of that closed population, rather than to animals from the Washington inland waters stock as a whole. For transient killer whales, we estimate take based on an assumption that a single pod of whales, comprising six individuals, is present in the vicinity of the project area for the entire duration of the project. These six individuals represent a small number of transient killer whales, for which a conservative minimum estimate of 354 animals was given in the 2011 Stock Assessment Reports. With the exception of the bubble curtain, potential efficacy of mitigation measures in terms of reduction in numbers and/or intensity of incidences of take has not been quantified. Therefore, these take numbers are likely to be conservative.

Negligible Impact Analysis

Pile driving activities associated with the barge mooring project, as outlined previously, have the potential to disturb or displace marine mammals. Specifically, the proposed activities may result in take, in the form of Level B harassment (behavioral disturbance) only, from airborne or underwater sounds generated from pile driving. Potential takes could occur if

individuals of these species are present in the ensonified zone when pile driving is happening, which is likely to occur because (1) harbor seals, which are frequently observed along the NBKB waterfront, are present within the WRA; (2) sea lions, which are less frequently observed, transit the WRA en route to haul-outs to the north at Delta Pier; or (3) cetaceans or pinnipeds transit the larger Level B harassment zone outside of the WRA.

No injury, serious injury, or mortality is anticipated given the methods of installation and measures designed to minimize the possibility of injury to marine mammals. The potential for these outcomes is minimized through the construction method and the implementation of the planned mitigation measures. Specifically, vibratory hammers will be the primary method of installation, and this activity does not have significant potential to cause injury to marine mammals due to the relatively low source levels produced (less than 190 dB) and the lack of potentially injurious source characteristics. Impact pile driving produces short, sharp pulses with higher peak levels and much sharper rise time to reach those peaks. When impact driving is necessary, required measures (use of a sound attenuation system, which reduces overall source levels as well as dampening the sharp, potentially injurious peaks, and implementation of shutdown zones) significantly reduce any possibility of injury. Likewise, Level B harassment will be reduced to the level of least practicable adverse impact through the use of mitigation measures described herein. that, given sufficient "notice" through mitigation measures including soft start (for impact driving), marine mammals are expected to move away from a sound source that is annoying prior to its becoming potentially injurious, and the likelihood that marine mammal detection ability by trained observers is high under the environmental conditions described for Hood Canal, enabling the implementation of shutdowns to avoid injury, serious injury, or mortality.

Effects on individuals that are taken by Level B harassment, on the basis of reports in the literature as well as monitoring from past projects at NBKB, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring). Most likely, individuals will simply move away from the sound source and be temporarily displaced from the areas of pile driving, although even this reaction has been observed primarily only in association with impact pile driving. In response to vibratory driving, harbor seals (which may be somewhat habituated to human activity along the NBKB waterfront) have been observed to orient towards and sometimes move towards the sound.

For pinnipeds, no rookeries are present in the project area, there are no haul-outs other than those provided opportunistically by man-made objects, and the project area is not known to provide foraging habitat of any special importance. No cetaceans are expected within the WRA. The pile driving activities analyzed here are similar to other nearby construction activities within the Hood Canal, including two recent projects conducted by the Navy at the same location (test pile project and EHW-1 pile replacement project) as well as work conducted in 2005 for the Hood Canal Bridge (SR-104) by the Washington Department of Transportation, which have taken place with no reported injuries or mortality to marine mammals, and no known long-term adverse consequences from behavioral harassment.

In summary, this negligible impact analysis is founded on the following factors: (1) the possibility of injury, serious injury, or mortality may reasonably be considered discountable; (2) the anticipated incidences of Level B harassment consist of, at worst, temporary modifications in behavior; (3) the absence of any major rookeries and only a few isolated and opportunistic haul-out areas near or adjacent to the project site; (4) the absence of cetaceans within the WRA and generally sporadic occurrence outside the WRA; (5) the absence of any other known areas or

features of special significance for foraging or reproduction within the project area; (6) the presumed efficacy of the planned mitigation measures in reducing the effects of the specified activity to the level of least practicable impact. In addition, none of these stocks are listed under the ESA or considered of special status (e.g., depleted or strategic) under the MMPA, and all four are thought to be increasing. In combination, we believe that these factors, as well as the available body of evidence from other similar activities, including those conducted at the same time of year and in the same location, demonstrate that the potential effects of the specified activity will have only short-term effects on individuals. The specified activity is not expected to impact rates of recruitment or survival and will therefore not result in population-level impacts.

Determinations

While the number of marine mammals potentially incidentally harassed will depend on the distribution and abundance of marine mammals in the vicinity of the survey activity, we find that the number of potential takings, by level B harassment only, is small relative to the relevant regional stock or population numbers, and that the effect of the activity will be mitigated to the level of least practicable impact through implementation of the mitigation and monitoring measures described previously. Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, we find that the total taking from the activity will have a negligible impact on the affected species or stocks.

Impact on Availability of Affected Species or Stock for Taking for Subsistence Uses

No tribal subsistence hunts are held in the vicinity of the project area; thus, temporary behavioral impacts to individual animals will not affect any subsistence activity. Further, no population or stock level impacts to marine mammals are anticipated or authorized. As a result, no impacts to the availability of the species or stock to the Pacific Northwest treaty tribes are

expected as a result of the activities. Therefore, no relevant subsistence uses of marine mammals are implicated by this action.

Endangered Species Act (ESA)

There are no ESA-listed marine mammals expected to occur in the action area during the proposed action timeframe; therefore, no consultation under the ESA is required for such species.

National Environmental Policy Act (NEPA)

In compliance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.), as implemented by the regulations published by the Council on Environmental Quality (40 CFR parts 1500-1508), the Navy prepared an Environmental Assessment (EA) to consider the direct, indirect and cumulative effects to the human environment resulting from the barge mooring project. NMFS made the Navy's EA available to the public for review and comment, in relation to its suitability for adoption by NMFS in order to assess the impacts to the human environment of issuance of an IHA to the Navy. Also in compliance with NEPA and the CEQ regulations, as well as NOAA Administrative Order 216-6, NMFS has reviewed the Navy's EA, determined it to be sufficient, and adopted that EA and signed a Finding of No Significant Impact (FONSI) on July 3, 2013. The Navy's EA and NMFS' FONSI for this action may be found at http://www.nmfs.noaa.gov/pr/permits/incidental.htm.

Authorization

As a result of these determinations, we have issued an IHA to the Navy to conduct the described activities in the Hood Canal from the period of July 16, 2013, through September 30, 2013, provided the previously described mitigation, monitoring, and reporting requirements are incorporated.

Dated: July 10, 2013.

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Donna S. Wieting,

Director,

Office of Protected Resources,

National Marine Fisheries Service.

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